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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/884,256	06/19/2001	Jingsong Xia	31075-7 EQ3	3823
7590		02/07/2007	EXAMINER	
Troy J. Cole Woodard, Emhardt, Naughton, Moriarty and McNett Bank One Center/Tower 111 Monument Circle, Suite 3700 Indianapolis, IN 46204-5137			PATHAK, SUDHANSU C	
			ART UNIT	PAPER NUMBER
			2611	
SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE		
3 MONTHS	02/07/2007	PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

<b>Office Action Summary</b>	Application No.	Applicant(s)
	09/884,256	XIA ET AL.
	Examiner	Art Unit
	Sudhanshu C. Pathak	2611

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on Jan. 10<sup>th</sup>, 2007.
- 2a) This action is FINAL.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-7,9 and 13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1-7,9 and 13 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on June 19<sup>th</sup>, 2001 is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All    b) Some \* c) None of:
1. Certified copies of the priority documents have been received.
  2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                        | Paper No(s)/Mail Date: _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date: _____ | 5) <input type="checkbox"/> Notice of Informal Patent Application |
|   | 6) <input type="checkbox"/> Other: _____                          |

**DETAILED ACTION**

1. Claims 1-7, 9 & 13 are pending in the application.
2. Claims 8 & 10-12 have been canceled.

***Response to Arguments***

3. Applicant's arguments (filed on Jan. 10<sup>th</sup>, 2007) with respect to claims 1-7, 9 & 13 have been considered but are moot in view of the new ground(s) of rejection i.e. Claims 4 & 7 have been further rejected under 35 U.S.C. 112 (1<sup>st</sup>, Paragraph).
4. Applicant's arguments filed (filed on Jan. 10<sup>th</sup>, 2007) with respect to claims 1-7, 9 & 13 have been fully considered but they are not persuasive i.e. rejections under 35 U.S.C. 103(a) have been maintained.

In regards to the specific argument that "Birru does not teach that the number of decision feedback equalizer taps is greater than the Viterbi decoder states", this is incorrect. Birru teaches the number of taps to be greater than the number of stages (Fig. 10, element 720 & Paragraphs 82-84), wherein the each of the coefficients are multiplied to 12 symbols, therefore each multiplication operation is interpreted as a tap, as is known in the art.

In regards to the specific argument that "Birru does not teach stages in the decoder is different than the number of taps of the decision feedback equalizer", this is incorrect. Birru firstly teaches the decoder comprising a variable number of stages i.e. 16 or 12 stages depending on the ATSC standard (Paragraph 78). Furthermore, the reference discloses in (Fig. 10, element 720 & Paragraphs 83-84) comprising "X" decoder stages and "N" decision feedback equalizer taps wherein further as

described above the coefficients are multiplied to 12 symbols, therefore, indeed the Birru teaches that the stages in the decoder is different than the number of taps of the decision feedback equalizer.

***Claim Rejections - 35 USC § 112***

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. Claims 4 & 7 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

In regards to Claims 4 & 7, the claim discloses "An adaptive equalizer comprising: a Viterbi decoder having 16 stages and producing a decoded output; a mapper coupled to the decoded output, the mapper producing a mapped output; and a decision feedback equalizer coupled to the mapped output, the decision feedback equalizer having fewer than 16 taps; wherein each of the taps receives as input via the mapper output from a respective one of the 16 stages of the Viterbi decoder.". As can be seen the claim discloses a Viterbi decoder having 16 stages, and a

decision feedback equalizer having fewer than 16 taps and further each of the taps receives as input via the mapper output from a respective one of the 16 stages of the Viterbi decoder, however the specification does not disclose, to one of ordinary

skill in the art, that if the no. of taps is fewer than the no. of decoder stages, how the stages which are not mapped to the respective filter taps are mapped to which taps in the equalizer i.e. what happens to the stages which do not have corresponding filter taps.

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1-7, 9 & 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Birru (PG-Pub No. 2002/0172275) in view of Applicant Admitted Prior Art (AAPA).

Regarding to Claims 1, 3-7 & 9, Birru discloses an adaptive equalizer (Fig. 9) comprising a Viterbi decoder having multiple stages and producing a decoded output (Fig. 9, element 250 & Fig. 15, element 250 & Paragraphs 58-60 & Fig. 10, elements 1030-1060); a decision feedback equalizer (DFE) having multiple taps (Fig. 9, element 720 & Fig. 15, element 1520 & Fig. 10, element 720); wherein the output of the decoder stages is mapped to the respective taps of the decision feedback equalizer such that the taps receive the output from the earliest decoding stages (Fig. 10 & Fig. 12). However, Birru does not specify the Viterbi decoder having 16 stages and the decision feedback equalizer having more than 16 taps and a mapper element between the decoder and the decision feedback element.

The AAPA discloses a method and apparatus for decoding data in a digital wireless communication system using a Viterbi decoder (Specification, Page 7, lines 11-23 & Fig. 3, element 350 & Fig. 6). The AAPA further discloses a trellis encoder to include a symbol mapper; wherein implementing a Viterbi decoder is implemented to decode the encoded data (Specification, Page 7, lines 5-12 & Fig. 4). The AAPA further discloses the viterbi decoder to include a number of stages, most often 16 or 24 (Specification, Page 7, lines 11-14). The AAPA further discloses the input into the decision feedback equalizer is the output of the mapper (Specification, Page 6, lines 15-16). The AAPA further discloses the decision feedback equalizer to include "M" stages (Specification, Page 6, lines 16-20). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that the AAPA teaches implementing a Viterbi decoder comprising 16 stages and a mapper so as to generate a mapped scaled output and this can be implemented in the adaptive equalizer as described in Birru such that the taps of the decision feed back equalizer receive as input the mapper output from the respective stages of the viterbi decoder so as to compared the decoded/recoded data to the encoded received data so as to decode a signal encoded in an 8VSB system. Furthermore, there is no criticality in implementing the decision feed back equalizer with more than 16 taps or fewer than 16 taps, the selection depends on the accuracy or the complexity (computation time) desired in implementing the adaptive equalizer, therefore the selection of the number of taps is a matter of design choice.

Regarding to Claim 2 & 13, Birru in view of AAPA discloses an adaptive equalizer comprising a viterbi decoder, a mapper coupled to the decoder output, a decision feed back equalizer (DFE) coupled to the output of the mapper, wherein the input to each of the respective taps of the DFE is the output of the respective decoder stages via the mapped output as described above. Birru also discloses the adaptive equalizer further comprising an FIR filter (Fig. 9, element 710 & Fig. 10, element 710 & Fig. 15, element 1510 & Fig. 8 & Paragraphs 72-73). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Birru in view of AAPA satisfies the limitations of the claims.

***Conclusion***

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

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10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sudhanshu C. Pathak whose telephone number is (571)-272-3038. The examiner can normally be reached on M-F: 9am-6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh M. Fan can be reached on (571)-272-3042.

The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Sudhanshu C. Pathak  
Examiner  
Art Unit 2611